Abstract Submitted
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Measurement of the nonlinear Meissner effect (NLME) with an on-chip cavity[1] NICKOLAS GROLL, ALEX GUREVICH, IRINEL CHIORESCU, Dept. of Physics & NHMFL, Florida State University, Tallahassee, Fl 32310 — Meissner effect is one of the fundamental manifestations of the macroscopic phase coherence of a superconducting (SC) state. At high fields, the superfluid density is dependent on the velocity of the condensate resulting in the NLME [1,2]. We report observation of the NLME in Nb films by measuring the resonance frequency of a planar SC cavity as a function of the magnitude and the orientation of a parallel magnetic field [3]. Using low power rf probing in films thinner than the London penetration depth, significantly increases the field for the vortex penetration onset and enables NLME detection under true equilibrium conditions. The data agrees very well with calculations based on the Usadel equations. We propose to use NLME angular spectroscopy to probe unconventional pairing symmetries in superconductors.

[1] S.K. Yip and J.A. Sauls, *PRL* 69, 2264 (1992)
[2] R. Prozorov and R.W. Giannetta, *Supercond. Sci. Technol.* **19**, R41 (2006).
[3] N. Groll, A. Gurevich, I. Chiorescu, *submitted*, arXiv:908.4097

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